

# Single Cell Transcriptome Analysis of Regenerating RGCs Reveals Potent Glaucoma Neural Repair Genes

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Hybrid: Rosedale Room and Zoom

For Researchers



Speaker:

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Host: **Jian Zhong, Ph.D.**

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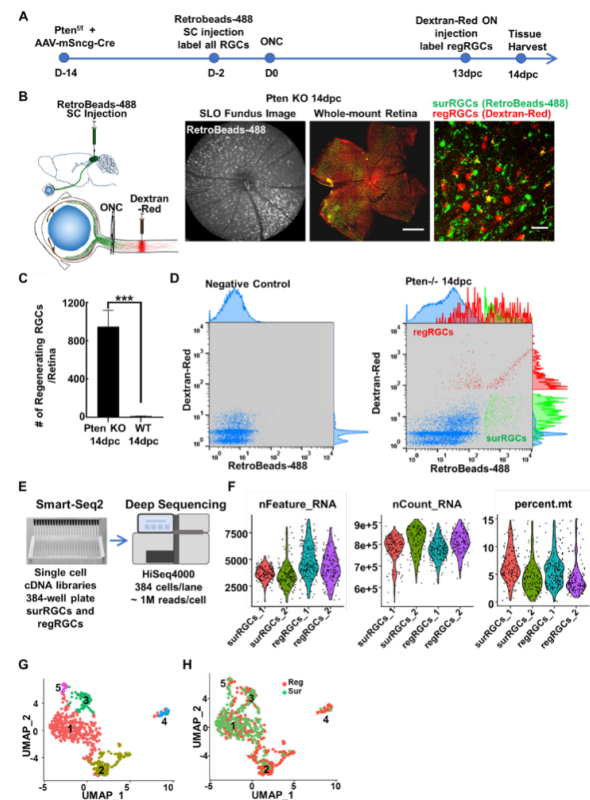
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## Abstract

Axon regeneration holds great promise for neural repair of CNS axonopathies, including glaucoma. Pten deletion in retinal ganglion cell (RGC) promotes potent optic nerve (ON) regeneration, but only a small population of Pten-null RGCs are actually regenerating RGCs (regRGCs); most surviving RGCs (surRGCs) remain non-regenerative. Here we developed a strategy to specifically label and purify regRGCs and surRGCs respectively from the same Pten deletion mice after ON

crush injury, in which they differ only in their regeneration capability. Smart-Seq2 single cell transcriptome analysis revealed multiple novel regeneration-associated genes that significantly promote axon regeneration. More strikingly, some of the axon regeneration genes dramatically protect RGC somata and axons and preserves visual function in a clinically relevant model of glaucoma, demonstrating the exciting potential of this innovative strategy to identify novel effective neural repair candidates.



1. Li L, Fang F, Zhuang P, Feng X, Zhuang P, Huang H, Liu P, Liu L, Xu AZ, Qi LS, Cong L, Hu Y. Single Cell Transcriptome Analysis of Regenerating RGCs Reveals Potent Glaucoma Neural Repair Genes Under revision
2. Fang F, Zhuang P, Feng X, Liu P, Liu D, Huang H, Li L, Chen We, Liu L, Sun Y, Jiang H, Ye J, Hu Y. NMNAT2 Is Downregulated in Glaucomatous RGCs and RGC-Specific Gene Therapy Rescues Neurodegeneration and Visual Function Molecular Therapy. 2022 Jan 31:S1525-0016(22)00074-0. PMID: 35114390
3. Wang Q, Zhuang P, Huang H, Li L, Liu L, Webber HC, Dalal R, Siew L, Flior CM, Chang K, Nahmou M, Kreymerman A, Sun Y, Meyer JS, Goldberg JL, Hu Y. Mouse gamma-Synuclein Promoter-Mediated Gene Expression and Editing in Mammalian Retinal Ganglion Cells. Journal of Neuroscience. 2020; May 13;40(20):3896-3914. PMC7219295